Alco Sportpla

Rubber Scale models don't come much easier to build than this old home-built flivver of 1929. It flies well enough to be very competitive. It won at the 1983 National Contest. ■ Don Srull

Photos by Tom Schmitt

IN 1930 the *Modern Mechanics Flying Manual* ran a two-part construction article for a full-size, very simple home-built airplane called the Alco Sportplane. Plans and parts for the one-seater monoplane had been available from the Allison Airplane Co. in Lawrence, KS since 1920.

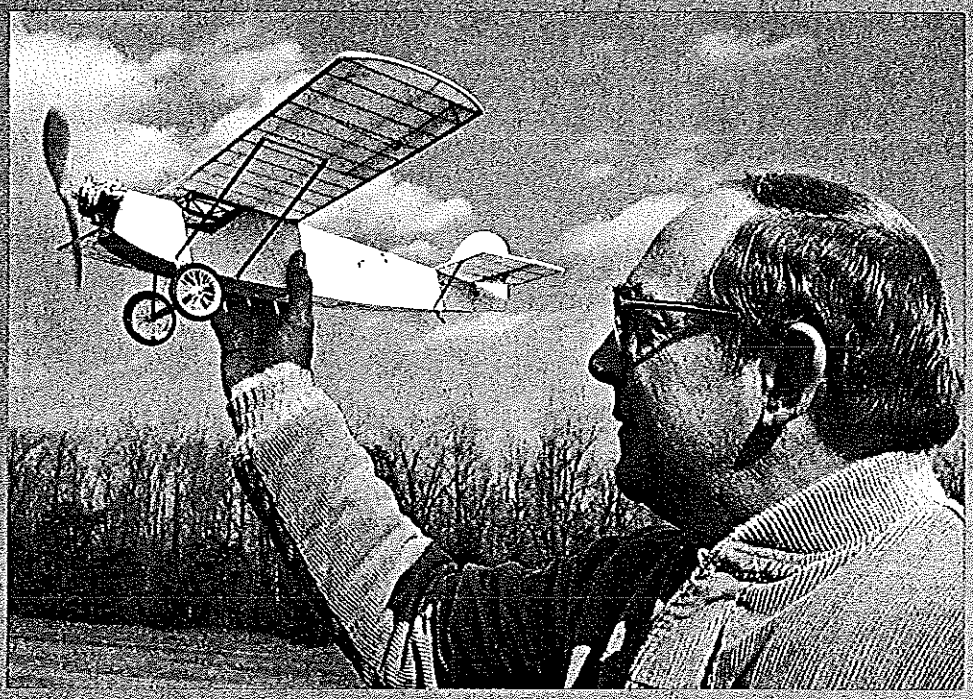
According to John Allison, the Alco's designer, hundreds of the little flivvers had been successfully built and flown by amateur craftsmen and fledgling aviators. No wonder. The Alco cost only $100 to build, and for another $35 a second-hand Harley V-twin motorcycle engine would get you into the air. If you wanted to go first class, $100 would buy a brand new Lawrence, 28-hp twin-cylinder aircraft engine.

I'm not sure how well the full-size Alco Sportplanes flew, but the boxy, ultra-simple structure that was designed for basement and barnyard building makes it a very easy-to-build, good flying model.

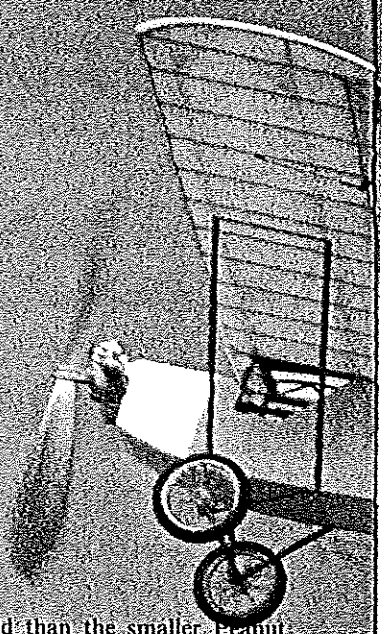
Dave Stott, reknowned Scale designer and one of the Flying Aces' prime movers, may have been the first to recognize the Alco's potential. Dave designed a neat little Peanut model (a 13-in. span turns out to be exactly ¾ in. = 1 ft. scale) back in 1969. It proved to be an outstanding flier, and the design still shows up occasionally at local flying fields.

Dave steered me to a good three-view drawing put together by Gerald Meyer in 1982. In it the Alco's general layout and construction features are clearly documented. I used Meyer's drawing to design the 26-in.-span, 1 in. = 1 ft. scale, model presented here.

The original intent was to put together a very simple (but Scale) rubber-powered model that would be an easy first step into the fun world of Free Flight Scale. The model did turn out to be quite easy to build and to fly—as Scale models go. For guys like me with fat fingers, it is even easier to build than the smaller Peanut version. To get good flight performance, some care will be needed to keep the weight down and to make sure that everything is straight and properly aligned.



Author Don Srull holds the Alco in hand-launching position. The prototype's boxy shape and nice moments assure good model flying characteristics. Simple scale detailing, such as control horns and cables, add a lot to the otherwise stark model. Finish simulates muslin.

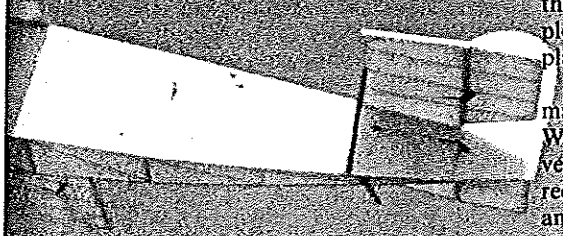


Several simplifying changes are indicated on the plans that will help speed things up for the less-experienced builder. The compromises to scale appearance will hardly be noticed, and flying qualities will actually be helped somewhat. The changes involve a) simpler wing ribs and spar structure (you can also leave out every other rib if you like), b) building single piece, non-hinged tail surfaces, and c) using a simplified dummy engine nose block and cylinders (cork wrapped with thread) instead of the fully-detailed scale engine.

The model proved to be an extremely good and consistent flier. It can do over 1½ min. easily after the prettiest, straight takeoffs you can imagine. Keep the finished weight of your Alco below 2 oz., minus rubber, and you can be sure of flight times of at least 1 min.

The structure of the model duplicates very closely that of the full-scale airplane. I wouldn't be surprised if John Allison was a model builder, too. Most of the surface details (other than the engine), such as control horns, cables, gas cap, etc., are lightweight and quite simple. They do add greatly to the appearance and character of the otherwise stark and simple model.

The Alco heads for the wild blue a split second after leaving the author's hands. At a scale of 1 in. = 1 ft., it has a wingspan of 26 in. Keep the weight of your model below 2 oz., minus the rubber motor, and you can be pretty sure of flight times of at least a minute.



Because it can be built very scalelike and still fly extremely well, the Alco is a competitive threat for both Indoor and Outdoor Rubber Scale events.

I added some extra detail to my model that isn't really necessary; some of it may be visible in the close-up photos of the cockpit interior. It includes scale built-up ribs in the wing center section, a fake fuel tank and fuel line, and dummy metal strut fittings. You can't see this stuff while the Alco is up in the air doing its things, so unless you enjoy such extra detailing, leave it off.

Construction. Build the two fuselage sides from firm and straight 1/8 sq. balsa. Notice that the cabin side openings are different on the right and left sides. Crack the longerons at the forward and rear cabin stations, and join the sides with 1/8 sq. crosspieces and diagonals. Use the plan top view to keep the fuselage aligned, and make sure the cross sections are squared up. Use temporary bulkheads, diagonals, pins, tape, or whatever to keep the fuselage lined-up at this stage. Add the nose formers, and sheet the front end with 1/32 balsa.

The tail is built from 1/16 balsa. The fin and wing tip curved pieces are laminated from three strips of 1/32 x 1/2 balsa. Cut forms for these shapes from 1/8 sheet balsa or cardboard. Moisten the balsa strips, and laminate three pieces with white glue. Carefully *pull* the wet laminate around the form, and pin it in place. When dry, you will have a perfectly-shaped neat, light, and sturdy part.

The wing can be built with a more scale appearance by using the sliced ribs and internal spar construction. A simpler and somewhat sturdier wing can be built using the alternative sheet balsa ribs and multiple spars. Both types are detailed on the plans.

The engine on the Alco is totally exposed, making it the most prominent scale detail. We show the opposed twin Lawrence engine version on the plans. For a beginner, we recommend the simple balsa nose block and simulated cylinders shown. You may, however, want to carve and sand an accurate replica of the Lawrence crankcase, oil cooler, magneto, etc., also detailed on the plan. A pair of plastic Williams Brothers cylinders will work nicely and cuts down the amount of work considerably. Another approach is to simply use two cork "cylinders" which have been wrapped with heavy string to simulate the cooling fins. When painted black, they don't look bad at all. Remember to make the front of your dummy engine removable, and add a 1/16-in. I.D. brass tube bushing for the prop shaft. Build in about 3° to 4° of downthrust and 2° to 3° right thrust. This should be pretty close to what you will need for good flying trim.

Covering and assembly. Sand the framework to get a smooth surface for the tissue covering. Make sure there are no blobs of glue or rough spots, particularly along the fuselage longerons and the wing leading and trailing edges.

Cover all surfaces with a good grade of white tissue. Shrink the covering by spraying it with a very light mist of water—or better yet, brush on a coat of rubbing alcohol. Pin the wing and tail surfaces to your building board as they dry to minimize warping. When dry, give all surfaces three or four coats of low-shrink dope (Sig Lite Coat works well and is readily available) which has been mixed with equal parts of dope thinner.

Since most Alcos were only clear-doped and had no markings, you can leave the tissue as it is. Alternatively, you can simulate the color of the cotton muslin fabric by spraying on a very light coat of Floquil Antique White. Floquil is a lacquer-type model paint used in railroad and plastic modeling. My model was finished in this way, and it looks much better than the plain white tissue. For a little more color, since many Alcos probably were finished off with a coat of aluminum dope to protect them against the sun's destructive effects, an all-aluminum model would be authentic. For that matter, if several hundred of these flivvers actually were built over the years, every basic paint color obtainable in old-fashioned hardware stores was probably used.

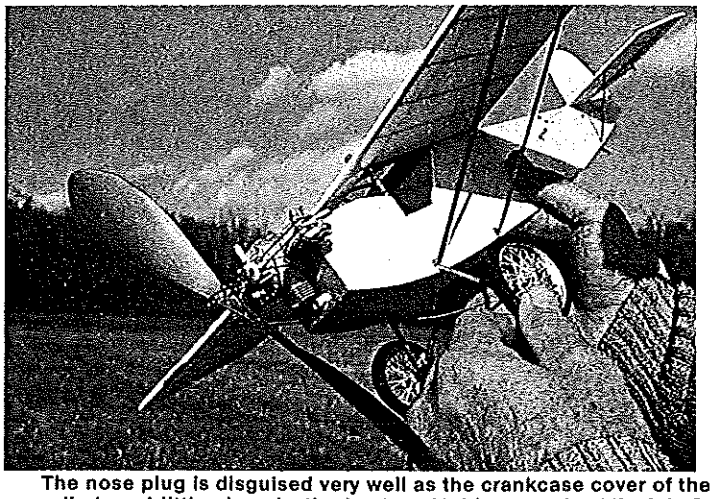
Paint the nose block light gray and the cylinders black, and glue the unit to the firewall bulkhead. Paint the exposed cabin struts a medium brown color. Since the Alco supposedly had no windows or windscreen (hard to believe!), we can now assemble the model.

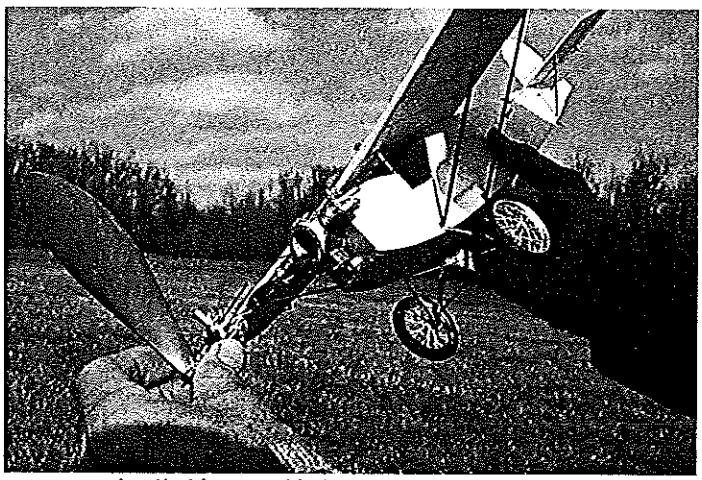
Attach the wing to the fuselage with a few small spots of Ambroid glue at the bottom spars and the trailing edge. Not much is needed; the wing should pop off, rather than tear the fuselage cabin apart if it hits hard. Next, attach the tail surfaces; use shims if necessary to get alignment with the wing. Use a small amount of Ambroid for this, also. If the tail incidence proves to be way off, the surface can be removed easily by softening the spots of Ambroid with dope thinner.

Make up the wing struts and landing gear legs from very hard 1/16 x 1/8 balsa. After sanding, paint them brown. The landing gear joints at the fuselage can be reinforced with short pieces of thin piano wire (.015-in. dia.). Imbed 1/4-in. pieces of the wire halfway into the strut ends, and fit into fine holes drilled into the longerons. A touch of cyanoacrylate glue will provide an amazingly strong joint. Strap the 1/32-in. piano wire axle on, and mount the wheels.

Fulton Hungerford's marvelous spoked wheels will add a real touch of class. Solid disc wheels made from balsa, however, will be just as authentic.

Glue on the wing struts, using these to help remove any slight warp that may





The nose plug is disguised very well as the crankcase cover of the Lawrence engine that is carved in balsa with Williams Bros. plastic cylinders. A little wire, plastic sheet, and tubing round out the job. Spoked Hungerford wheels give the small rubber model added realism.

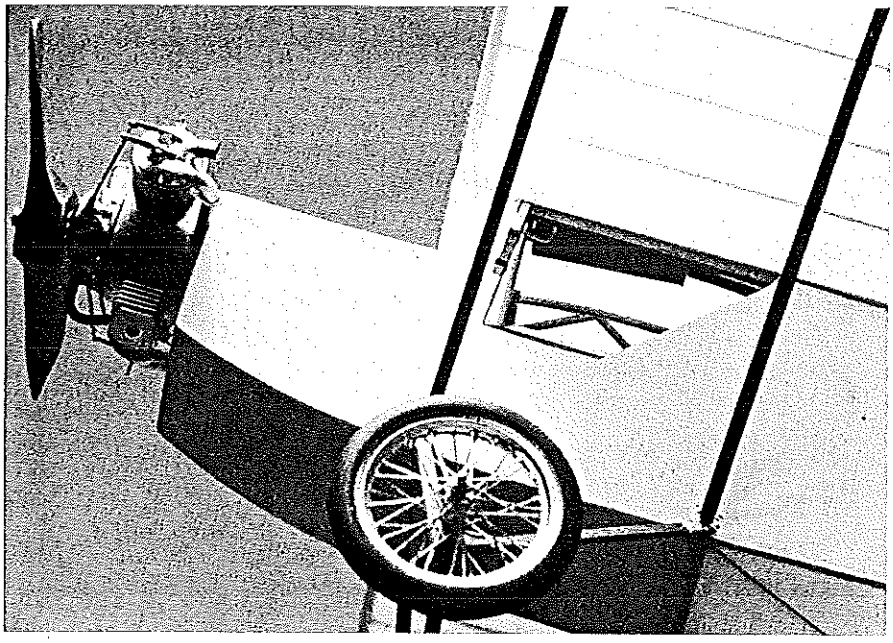
have crept in. It is not necessary, but you may want to use the wire pin reinforcement method to greatly strengthen the strut joints. Add the tail skid and any of the surface details you may want, and we are ready for the fun part: flying our new creation!

Flying. A standard 9½-in.-dia. plastic prop from Peck-Polymers works well on the Alco. Cut it down to a 9-in. dia. to provide better ground clearance for take-offs. Purists may want to carve a prop from balsa, and I must say they do look much nicer than the plastics. However, the plastics work as well, and they are considerably more sturdy.

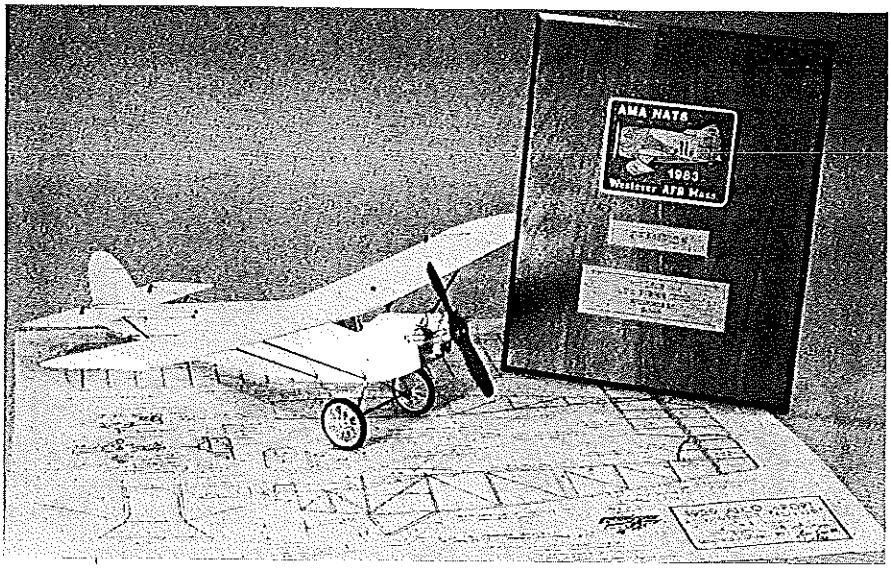
For testing purposes, make up a motor of one loop of ¼-in. rubber about 8 in. long. This motor can easily be hand-wound for short test flights, and it will not complicate glide adjustments by bunching in the nose or tail.

Make sure no warps are present and the balance point is between the two lower spars. With about 50 winds, glide the model. By adjusting the tail surfaces, or adding a small amount of clay ballast to the nose or tail, try for a long, smooth descent with a slight right turn. *Don't add more winds until this is exactly as you want it.* More power is not the way to adjust the cruise and glide portions of the flight. (It's amazing how many experts, as well as beginners, violate this simple rule.) A good way to help get a slight right turn is to add a little clay weight (about the size of a pea or smaller) to the right wing tip.

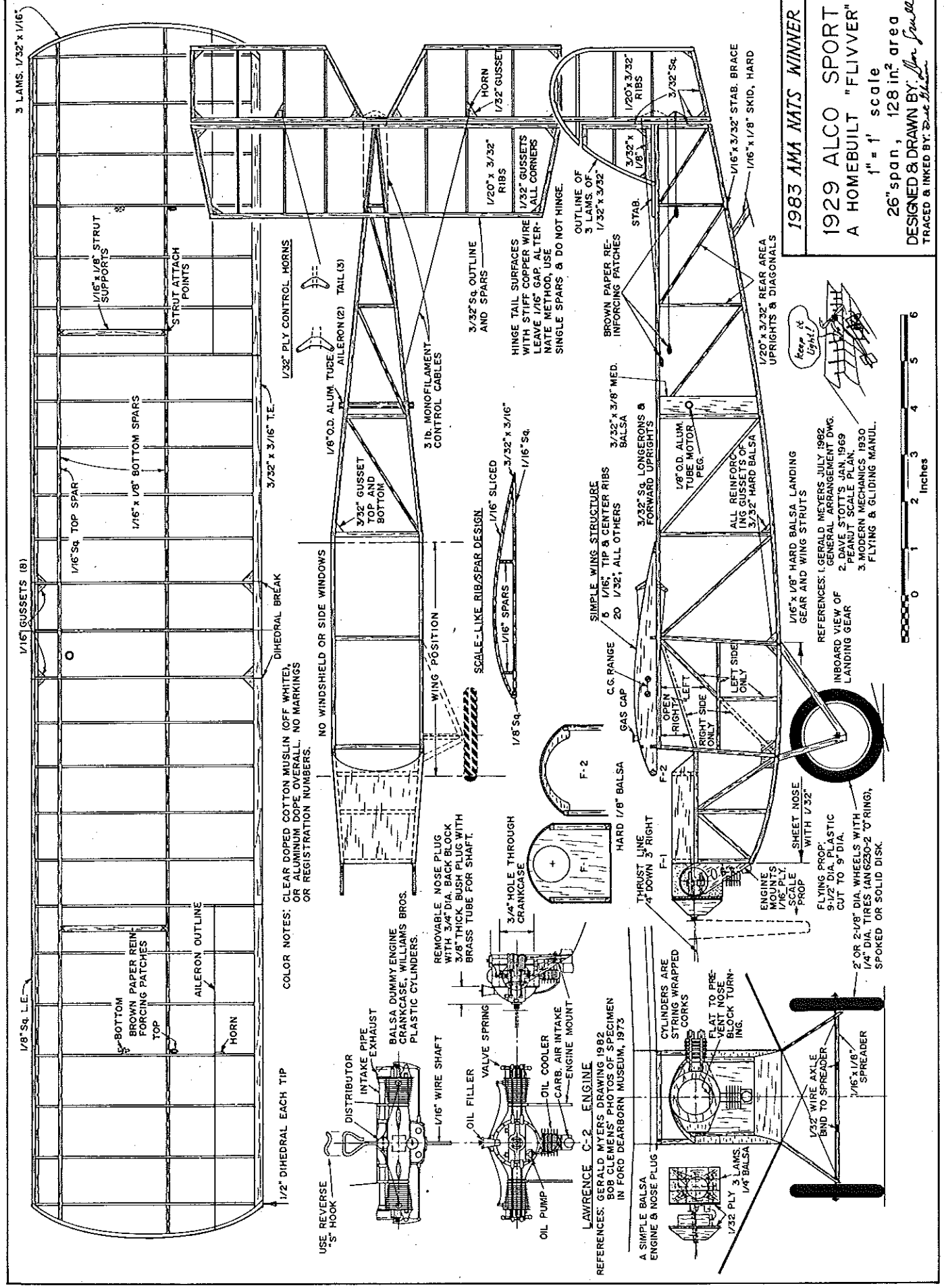
Slowly increase winds and begin to change the thrust line, not the tail surfaces, to maintain a wide right turn under power and in the glide. When you're satisfied, make up a larger, longer motor. Try four strands of 1/32-in. to 1/16-in. rubber, 18 in. to 30 in. long. These longer motors will have to be braided as tightly as necessary to remove all slack in order to preserve the really good glide the little Alco can have. Remember to rebalance the model after changing motors. Good flying!



Bottom of prototype's wing wasn't covered inside the cockpit area so there would be more headroom. Scale rib and fake gas tank and line look nice on the model, but aren't necessary.



The Alco won the Rubber Scale event of the 1983 Nationals, Srull's fourth win in seven consecutive years. The scale prop installed here (carved from a gas prop) isn't for flying.


1983 AMA NATS WINNER
1929 ALCO SPORT
A HOMEBUILT "FLIVVER"
1" = 1' scale
26" span, 128 in.² area
DESIGNED & DRAWN BY: Jim Sarra
TRACED & INKED BY: Dave Stott
3 LAMS. 1/32" x 1/16"
1/16" GUSSETS (8)
1/8" Sq. L.E.
1/16" Sq. TOP SPAR
1/16" x 1/8" BOTTOM SPARS
3/32" x 3/16" T.E.
1/16" x 1/8" STRUT SUPPORTS
STRUT ATTACH POINTS
1/32" PLY CONTROL HORNS
1/8" O.D. ALUM. TUBE AILERON (2) TAIL (3)
3/32" GUSSET TOP AND BOTTOM
3 lb. MONOFILAMENT CONTROL CABLES
3/32" Sq. OUTLINE AND SPARS
HORN 1/32" GUSSET
1/20" x 3/32" RIBS
1/32" GUSSETS ALL CORNERS
HINGE TAIL SURFACES WITH STIFF COPPER WIRE LEAVE 1/16" GAP, ALTERNATE METHOD, USE SINGLE SPARS & DO NOT HINGE.
OUTLINE OF 3 LAMS. OF 1/32" x 3/32"
1/20" x 3/32" RIBS
3/32" Sq.
3/32" x 1/8"
STAB.
1/16" x 3/32" STAB. BRACE
1/16" x 1/8" SKID, HARD
BROWN PAPER REINFORCING PATCHES
1/20" x 3/32" REAR AREA UPRIGHTS & DIAGONALS
Keep it Light!
3/32" x 3/8" MED. BALSA
1/8" O.D. ALUM. TUBE MOTOR PEG.
3/32" Sq. LONGERONS & FORWARD UPRIGHTS
ALL REINFORCING GUSSETS OF 3/32" HARD BALSA
1/16" SLICED
3/32" x 3/16" 1/16" Sq.
SCALE-LIKE RIB/SPAR DESIGN
1/16" SPARS
1/8" Sq.
WING POSITION
NO WINDSHIELD OR SIDE WINDOWS
DIHEDRAL BREAK
SIMPLE WING STRUCTURE
5 1/16" TIP & CENTER RIBS
20 1/32" ALL OTHERS
C.G. RANGE
GAS CAP
OPEN
RIGHT
LEFT
RIGHT SIDE ONLY
LEFT SIDE ONLY
F-2
F-1
HARD 1/8" BALSA
1/16" x 1/8" HARD BALSA LANDING GEAR AND WING STRUTS
INBOARD VIEW OF LANDING GEAR
REFERENCES: 1. GERALD MEYERS JULY 1982 GENERAL ARRANGEMENT DWG.
2. DAVE STOTT'S JAN. 1969 PEANUT SCALE PLAN.
3. MODERN MECHANICS 1930 FLYING & GLIDING MANUL.
0 1 2 3 4 5 6 Inches
COLOR NOTES: CLEAR DOPED COTTON MUSLIN (OFF WHITE), OR ALUMINUM DOPE OVERALL. NO MARKINGS OR REGISTRATION NUMBERS.
1/2" DIHEDRAL EACH TIP
AILERON OUTLINE
BOTTOM
BROWN PAPER REINFORCING PATCHES
TOP
HORN
3/4" HOLE THROUGH CRANKCASE
REMOVABLE NOSE PLUG WITH 3/4" DIA. BALSA BLOCK 3/8" THICK BUSH PLUG WITH BRASS TUBE FOR SHAFT.
THRUST LINE 4° DOWN 3° RIGHT
ENGINE MOUNTS 1/16" PLY. SCALE PROP
SHEET NOSE WITH 1/32"
FLYING PROP: 9-1/2" DIA. PLASTIC CUT TO 9" DIA.
2" OR 2-1/8" DIA. WHEELS WITH 1/4" DIA. TIRES (AN6230-2 "O" RING), SPOKED OR SOLID DISK.
1/16" x 1/8" SPREADER
1/32" WIRE AXLE BND TO SPREADER
FLAT TO PREVENT NOSE BLOCK TURNING.
CYLINDERS ARE STRING WRAPPED CORKS
1/32" PLY 3 LAMS. 1/4" BALSA
A SIMPLE BALSA ENGINE & NOSE PLUG
REFERENCES: GERALD MYERS DRAWING 1982
BOB CLEMENS' PHOTOS OF SPECIMEN IN FORD DEARBORN MUSEUM, 1973
LAWRENCE C-2 ENGINE
BALSA DUMMY ENGINE CRANKCASE, WILLIAMS BROS. PLASTIC CYLINDERS.
DISTRIBUTOR
INTAKE PIPE
EXHAUST
1/16" WIRE SHAFT
OIL FILLER
VALVE SPRING
OIL COOLER
CARB. AIR INTAKE
ENGINE MOUNT
OIL PUMP
USE REVERSE "S" HOOK